

## Independent evidence-based health care

*Bandolier* has a wide readership. On the same day we get emails from Stanford University in California, and the Kathmandu leper hospital. Sometimes, though, we feel the need to be parochial, especially as the football season ends and Summer begins. In Oxfordshire, summer means cricket, but it also marks the start of the Aunt Sally season.

### Aunt Sally

This game seems to be virtually unique to Oxfordshire. It consists of throwing sticks of wood about 45 cm long and 5 cm in diameter at a small white doll placed on an iron peg about 10 metres away (actually it is all inches and feet, but we are being international here).

Players have six sticks, and have to dislodge the doll without hitting the rod. This is not as easy as it sounds. *Bandolier*, purely for reasons of research, recently spent a sunny evening in a pub checking the statistics. Evidence suggests that good pub team players can hit the target up to four times out of six, with an average of two. Beginners find it hard to hit the doll once or twice in an evening.

The origins are obscure. Some suggest that it is a very old game, while others consider a nineteenth century origin. In any event, it has passed into the language as "a bit of an Aunt Sally" being something that metaphorical sticks get thrown at.

### Evidential Aunt Sally

There are many Aunt Sallys in healthcare, treatments and management. Most of us feel able to criticise, but evidence can help. For instance, discharge planning with post-discharge support of patients with congestive heart failure might seem unlikely to be beneficial, except in a soft and cuddly sort of way. But the evidence is that it produces better care at lower cost. Diagnostic and assessment centres for cancer are obviously a good thing, except that the evidence, such as there is, is largely silent on any benefits.

### Readers' Aunt Sallys

*Bandolier* likes to respond to reader queries, because they point out those topics that are your Aunt Sallys. This month you have stimulated a brief review of ankyloglossia, which would not have occurred to us otherwise. More prosaic, but interesting nonetheless, was asking about whether (or why) urine smells bad after eating asparagus, or urine is red (or not) after eating beetroot.

### TONGUE-TIE: ANKYLOGLOSSIA

Ankyloglossia is a congenital oral anomaly characterised by an unusually short lingum frenulum on the underside of the tongue. It is also called tongue tie. The condition can cause difficulties with breastfeeding, and speech and other problems in children and adults, including inability to lick the lips, play a wind instrument, or even with kissing.

There is a wide range of opinions regarding its significance, from having no significance to being the cause of significant problems [1]. *Bandolier* reviews the latest literature in the certain knowledge that someone will disagree with any conclusion.

*Bandolier* searched PubMed for any studies with ankyloglossia in title or abstract in the last 10 years. Those with abstracts that suggested them to be relevant for diagnosis, incidence or prevalence, or treatment, were retrieved and read.

### Prevalence

Table 1 shows the incidence or prevalence results in breastfeeding infants or older children. In three US studies prevalence was 218 of 6,527 infants, an overall incidence of 3.3%. The range of 1.7% to 4.8% may have reflected different diagnostic criteria, and perhaps slightly different populations of infants (all newborn, or just those breastfeeding). There were 141 male and 72 female infants, a male:female ratio of 2:1.

Two studies in Spain and Hungary examined ankyloglossia in older children. The prevalence in Spain was 2.4% in six years olds, and 4.4% in 14 year olds, while the incidence in a special clinic in Hungary was 0.9%. Again these were different populations and they used different assessment criteria. There were 37 male and 27 female children with ankyloglossia, a male:female ratio of 1.4:1.

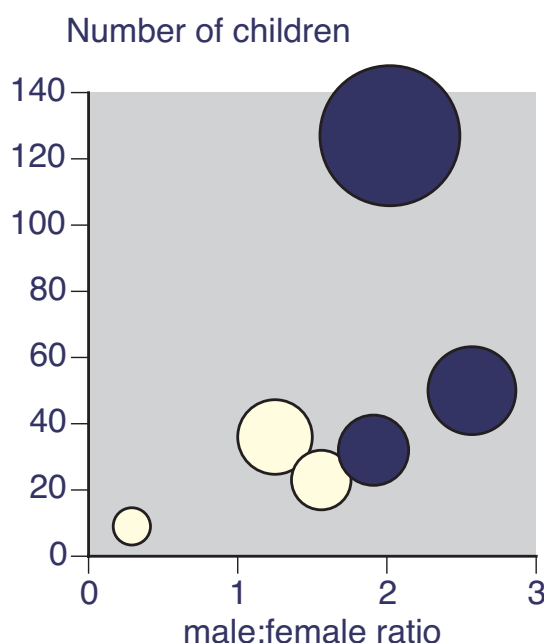
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**Table 1: Studies on ankyloglossia prevalence and incidence in newborns and older children**

Reference	Location	Population	Definition	Incidence or prevalence
<b>Breastfeeding</b>				
Masaitis. J Hum Lact 1996 12: 229-232	Oregon, USA	Breastfeeding newborns	Maternal questionnaire, and clinical diagnosis	41 in 2,450 over 18 months Incidence 1.7% 36 frenotomies 20 male, 16 female
Messner. Arch Otolaryngol Head Neck Surg 2000 126: 36-39	California, USA	Healthy neonates	Routine oral cavity examination, and clinical diagnosis	50 in 1,041 over 12 months Incidence 4.8% 36 male, 14 female 0 frenotomies
Ballard. Pediatrics 2002 110 (5): e63	Cincinnati, USA	Term breastfeeding infants	Examination by same investigator, Hazelbaker assessment method	127 in 3,036 infants over 42 months Incidence 4.2% 85 male, 42 female 123 frenotomies
<b>Older children</b>				
Pola. J Dent Child 2002 69: 59-62	Oviedo, Spain	Six and 14 year old children	Examination by same investigator, measuring lingual mobility and dysglossia	23 of 962 six year olds with short frenum Prevalence 2.4% 14 male, 9 female 32 of 732 14 year olds with short frenum Prevalence 4.4% 21 male, 11 female 55 frenectomies
Vörös-Balg. Oral Diseases 2003 9: 84-87.	Budapest, Hungary	Healthy children aged 1-14 treated in Pedodontic department over 18 months	Oral examination in a dental surgery	9 of 1,017 Incidence of 0.9% 2 male, 7 female

**Figure 1: Male:female ratio in ankyloglossia by size of study (dark symbols neonates)**



Over all the studies, the male:female ratio was 1.8. Figure 1 shows the individual studies (two age ranges in one study in children), and demonstrates greater variability in the ratio with smaller samples.

## Breastfeeding

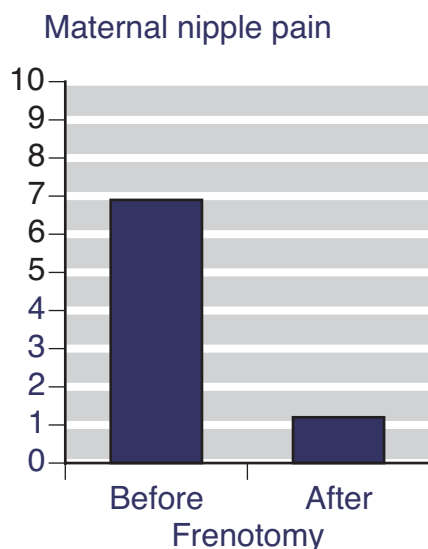
To successfully nurse, an infant must latch on to the mother's areola with gum ridge, buccal pads and tongue. Movement of the jaw and tongue then squeeze milk from the ductules in the nipple, and tongue movements promote swallowing. Restriction of tongue movement because of a short lingum frenulum can affect latching on, and make feeding difficult for the infant and painful for the mother.

Untreated ankyloglossia can lead to more breastfeeding problems. In 36 mothers of affected infants, nipple pain lasting longer than six weeks, or difficulty with the baby latching on to the breast occurred in 9 (25%), compared with one of 36 (3%) in a control group of mothers with unaffected infants [2].

Surgical attention to the frenulum might make things better. In a small case series of 36 mother-infant pairs after frenectomy, most reported normal range of motion of tongue with complete or partial resolution of feeding problems by one week, and all by three months [3]. Breast feeding was continuing in 19 of 36 women at three months, and only two mothers discontinued because of ongoing breast feeding problems.

A larger and more detailed case series came to similar conclusions [4]. Here mean nipple pain was very significantly

**Figure 2: Nipple pain on a 10-point scale before and after frenectomy in one study**



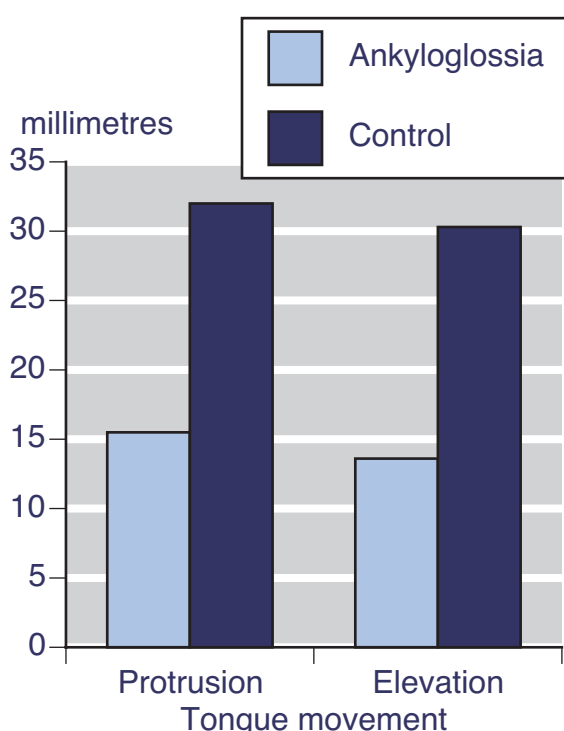
less after than before the operation (Figure 2). Ankyloglossia accounted for 35 of 273 (13%) mothers with breastfeeding problems seen at the outpatient lactation centre. Of these 31 were feeding more comfortably after the procedure. Three discontinued, and one was advised to bottle feed by a paediatrician.

## Older children and adults

Two small but recent uncontrolled studies say something about surgery for ankyloglossia in children and adults.

In 30 children with ankyloglossia aged 1-12 years, surgery improved tongue protrusion and elevation [5]. In 15 children who had preoperative speech problems, improved articulation was found in nine after operation.

**Figure 3: Tongue movement in adolescents and adults with ankyloglossia and controls**



In 15 adolescents and adults with ankyloglossia aged 14 to 68 years [6], tongue protrusion and elevation were markedly less than in 20 controls (Figure 3). Surgery improved tongue protrusion and elevation by an average of 9 and 13 mm respectively.

## Comment

That is essentially all the information found. No controlled trials in infants, not much about problems with older children or adults. Obviously paediatricians and ENT surgeons will see more severe cases, and general practitioners and midwives will refer some of the cases they see. Some cases may resolve spontaneously, or affected persons learn to compensate, but others may benefit from treatment.

But in the main this appears to be one of those areas where there is much opinion but little evidence. A much more thorough review [7] concludes that controversy is fuelled by lack of good information about intervention.

It is surprising that there is not more good information. Ankyloglossia is not rare, affecting one to four babies in every 100. There is a congenital component, but we know little about other possible associations, except possibly with cocaine use in pregnancy. Clearly there is a need for more research, which need be neither expensive nor complicated. Less opinion, please, and more evidence. A great topic for postgraduate qualifications and the tongue-tied.

### References:

- 1 AH Messner, ML Lalakea. Ankyloglossia: controversies in management. *International Journal of Pediatric Otorhinolaryngology* 2000 54: 123-131.
- 2 AH Messner et al. Ankyloglossia: incidence and associated feeding difficulties. *Arch Otolaryngol Head Neck Surg* 2000 126: 36-39.
- 3 NS Masaitis, JW Kaempf. Developing a frenectomy policy at one medical centre: a case study approach. *Journal of Human lactation* 1996 12: 229-232.
- 4 JL Ballard et al. Ankyloglossia: assessment, incidence, and effect of frenuloplasty on the breastfeeding dyad. *Pediatrics* 2002 110:e63 ([www.pediatrics.org/cgi/content/full/110/5/e63](http://www.pediatrics.org/cgi/content/full/110/5/e63))
- 5 AH Messner, ML Lalakea. The effect of ankyloglossia on speech in children. *Otolaryngol Head Neck Surg* 2002 127: 539-545.
- 6 ML Lalakea, AH Messner. Ankyloglossia: the adolescent and adult perspective. *Otolaryngol Head Neck Surg* 2003 128: 746-752.
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# DISCHARGE PLANNING FOR CHF

It is common for older people with congestive heart failure (CHF) to be readmitted to hospital within six months of hospital discharge. In the USA, up to half might expect to be readmitted, and it is stressful for the patients themselves, as well as consuming considerable resources. A new systematic review suggests that comprehensive discharge planning with post-discharge support can reduce readmission rates, and probably increase quality of care at lower cost [1].

## Systematic review

Seven electronic data sources and reference lists were searched for studies. Included were English-language publications of randomised trials with detailed descriptions of interventions to modify discharge for older inpatients. Older meant study mean age of 55 years or more. Studies specifically addressing heart failure, that described components of inpatient care and of post-discharge support compared with usual care, and which reported readmission rates, were accepted.

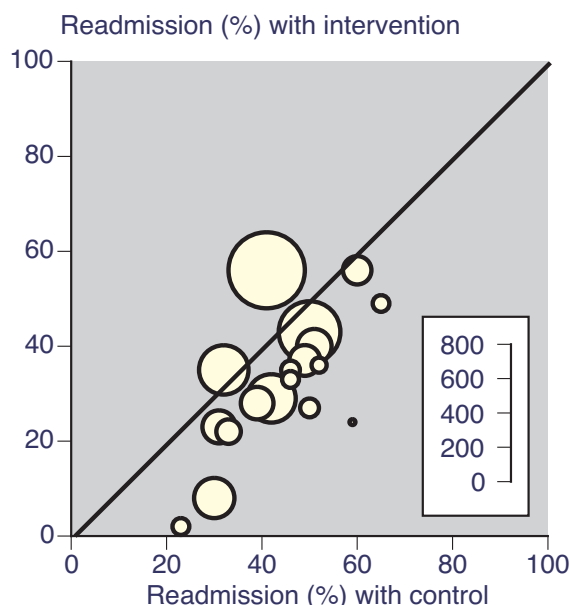
## Results

Eighteen randomised trials were eligible, from North America, Europe, and Australia. Though most studies could not be double blind, most reported blinded assessment of outcomes and scored well on a common scale of reporting quality, indicating little possibility of bias. All studies had more than 90% of patients participate in the whole study, and study duration was three to 12 months.

There were various interventions, with various components, which were split into five main categories (Table 1). Compared with usual care, most interventions produced lower readmission rates (Figure 1). The average readmission rate was 43% with usual care, reduced to 35% with the intervention.

Significantly lower rates were found for all categories except one (Table 1). Overall, one readmission was avoided

**Figure 1: Readmission rates in patients with CHF with post-discharge support**



for every 13 patients included in comprehensive discharge planning with some post-discharge support. In the 13 trials that concentrated on home contacts or services, readmission rates with intervention were 36% compared with 45% in usual care, and the NNT to prevent one readmission was 10 (7 to 17).

Sensitivity analysis showed no significant differences with age, severity of left ventricular function, ACE inhibitor use, duration of follow up, size of trial, or for US versus other countries. Heart failure or cardiovascular specific readmission had similar absolute risk reduction.

Mortality was not significantly different, at 17% for usual care and 14% for intervention patients. The relative risk was 0.9 (0.7 to 1.03). Quality of life was significantly better in intervention patients.

Eleven studies reported medical costs in a variety of ways. The pooled cost difference favoured intervention patients, with a mean reduction of \$536 and \$359 in US and non-US studies. The cost of delivering the intervention was \$81

**Table 1: Results for different intervention plans according to post-discharge support**

Type of intervention	Number of		Readmission (%)		Relative benefit (95% CI)	NNT (95% CI)
	Studies	Patients	Intervention	Control		
Single home visit	3	476	41	53	0.8 (0.6 to 0.9)	8 (5 to 29)
Increased clinic follow up and/or frequent telephone contact	4	765	41	39	1.0 (0.9 to 1.2)	64 (19 to -11)
Home visit and/or frequent telephone contact	6	970	38	49	0.8 (0.7 to 0.9)	9 (6 to 22)
Extended home care services	4	859	30	36	0.8 (0.7 to 0.99)	17 (8 to -300)
Day hospital services	1	234	8	30	0.3 (0.1 to 0.5)	4 (3 to 8)
<b>All studies</b>	<b>18</b>	<b>3304</b>	<b>35</b>	<b>43</b>	<b>0.8 (0.7 to 0.9)</b>	<b>13 (9 to 21)</b>

(range \$76 to \$116) per patient per month in the US studies, and \$56 (range \$17 to \$104) per patient per month in non-US studies.

Comment

This is a good review on an important topic. It is gratifying that there were as many as 18 randomised trials of a management rather than a clinical intervention, and that there was a clear answer. A better-planned care pathway produced better health outcomes and better quality of life to patients, and at lower cost.

Where comprehensive discharge planning with post-discharge support for older patients with congestive heart failure is routine, participants can be happy that they are doing well. Where such a service does not exist, this provides the framework for thinking about change.

Reference:  
1 CO Phillips et al. Comprehensive discharge planning with postdischarge support for older patients with congestive heart failure: a meta-analysis. JAMA 2004 291: 1358-1367.

CANCER DIAGNOSTIC ASSESSMENT CENTRES

It is a curious fact that while individual interventions in medicine are rigorously assessed, others are not. That sentence could be taken to refer to the difference between drugs, say, which go through long and exhaustive efficacy and safety trials with complex and detailed regulatory hurdles, compared with many unconventional therapies that can be sold to patients with little or no testing.

But inside conventional medicine major interventions can be introduced without testing. These are usually top-down management changes, often introduced to “improve” service delivery and performance where there is some perceived problem.

One such has been cancer diagnosis, with a move towards one-stop diagnostic assessment (and often treatment) centres, to better coordinate care by concentrating services, multidisciplinary consultative expertise, patient information resources and psychosocial support for patients at a difficult time. It would seem blindingly obvious that this is a better idea than any other ad-hoc arrangement. A systematic review [1] makes uncomfortable reading.

Systematic review

Multiple databases were searched for English-language articles published between 1985 and end-2002. Randomised trials, case-control studies, prospective or retrospective cohort studies were sought examining outcomes of one-stop diagnostic centres. Cancers involved included breast, lung, prostate, head and neck, or colorectal cancer, and the studies had to involve diagnostic assessment. Only full published studies were accepted.

Results

There were 20 studies (Table 1), 11 in breast cancer, three in colorectal cancer, and six in head and neck cancer. Information was reported on 18 of the 20 trials. Most were small, and 12 of the 18 reported information on fewer than 500 patients, many on fewer than 150.

Few studies examined quality of care, whether by reporting quality or accuracy of

diagnosis, or patients diagnosed in a single visit, or reported clinical or economic outcomes. The two randomised trials in breast cancer hinted that patient anxiety might be lower in the first few days, but probably not thereafter.

Comment

Systematic reviews that tell us what we do not know can be more useful than those confirming what we do know. Though some work has been done on examining diagnostic assessment units in oncology, no single study has rigorously examined those managerial and clinical characteristics required to deliver a quality service.

Service changes possibly do not need randomised trials. But they do need to be evaluated, to have quality assessment programmes and checks, to be subject to audit, and even to periodic external review. None of this is new in health care. Every laboratory in every hospital does this every day to check that results are right, and to spot when something goes wrong. So do car factories.

Introducing major changes to effect improvement is good. But we need to get it right. It is a culture thing. We are unlikely to get it right first time; we will make mistakes. What we have to do is praise mistakes, for we will learn from them and be better for it. This paper [1] is a great start.

Reference:  
1 A Gagliardi et al. Evaluation of diagnostic assessment units in oncology: a systematic review. Journal of Clinical Oncology 2004 22: 1126-1135.

Table 1: Major findings in studies of cancer diagnostic and assessment centres

Cancer	Studies	Patients	Major findings
Breast	11 total	4614	The two randomised trials showed no real difference in anxiety except in first few days.
	2 RCTs	1269	
	6 prospective cohort	1084	
	2 retrospective cohort	1922	
	1 case-control	339	
Colorectal	2 total	3316	None
	1 prospective cohort	3119	
	1 retrospective cohort	197	
Head and neck	5 total	427	None
	2 prospective cohort	134	
	3 retrospective cohort	293	

# STATINS AND STROKE OUTCOME

We know that statins reduce the rate of ischaemic stroke by about 25% or so, though probably not that of haemorrhagic stroke. A more difficult question is whether ischaemic strokes that occur with people taking statins are different in any way from those in people not taking statins. An observational study implies that there is at least the possibility that outcome after stroke is better in those who take statins [1].

## Study

Consecutive patients admitted to the National Institutes of Health stroke programme in Maryland between mid-2000 and end-2002 were studied. There were 436 who had ischaemic stroke (not haemorrhagic stroke, or transient ischaemic attack), and who were aged 18 years or more.

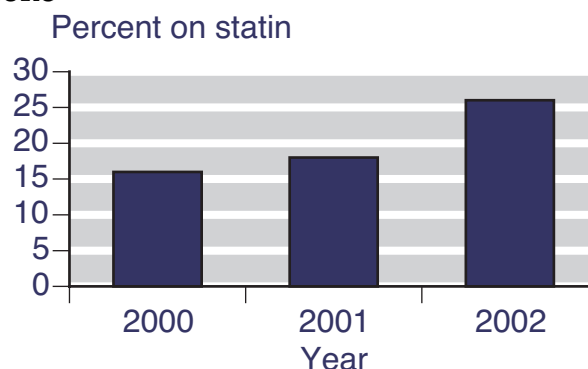
On admission, risk factors for stroke were elicited from patient or family, as well as relevant medications (lipid lowering, anticoagulant, and antiplatelet drugs). Stroke severity was scored using standard scales, on admission and with the modified Rankin scale (see box) on admission and discharge.

## Results

Of the 436 patients with stroke, 95 had been taking statins before their stroke occurred. The average age was 75 years in both groups, with about half women. Stroke scores were similarly distributed in both groups, and 77% in each group had admission Rankin scores below 2.

Those on prior statins and those not on prior statins were comparable for most demographic features, risk factors, and laboratory values. Those on statins were more likely to have

Figure 1: Statin use in patients admitted with stroke



coronary artery disease (47% vs 17%) and hyperlipidaemia (80% vs 25%), and were more likely to use antiplatelet or anticoagulant drugs (66% vs 43%). LDL-cholesterol concentrations were significantly lower in those on statins.

Statin use in patients admitted with stroke increased over the period (Figure 1). Discharge Rankin scores were available in 393 patients. Scores of 2 or less (good outcome) at discharge occurred in 43/84 (51%) in patients taking statins, compared to 118/309 (38%) in those not on statins (Figure 2). Mortality was similar in both groups (Figure 2).

Factors associated with better outcome were lower admission stroke severity, lower white cell count, prior use of statins, and younger age.

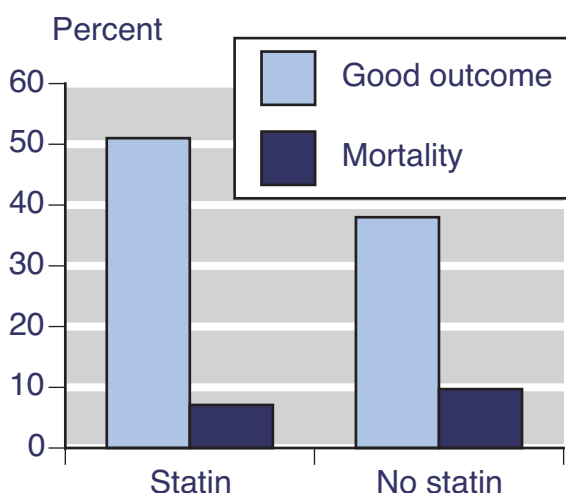
## Comment

No observational study provides certainty for a cause-effect relationship, unless a very considerable body of evidence can be built up, and the effect is large. One problem is that confounding may be going on because of factors whose importance we do not appreciate. Here, at least, patients in generally worse health before the stroke, and with a similar spectrum of severity of stroke, had a better outcome if they were taking a statin before they had their stroke.

Reference:

- 1 SS Yoon et al. Rising statin use and effect on ischemic stroke outcome. BMC Medicine 2004 2:4 ([www.biomedcentral.com/1741-7015/2/4](http://www.biomedcentral.com/1741-7015/2/4))

Figure 2: Outcome and mortality by preadmission statin use



### Modified Rankin scale

- 0 No symptoms at all
- 1 No significant disability despite symptoms; able to carry out all usual duties and activities
- 2 Slight disability; unable to carry out all previous activities, but able to look after own affairs without assistance
- 3 Moderate disability; requiring some help, but able to walk without assistance
- 4 Moderately severe disability; unable to walk without assistance and unable to attend to own bodily needs without assistance
- 5 Severe disability; bedridden, incontinent and requiring constant nursing care and attention
- 6 Dead

# NEURAL TUBE DEFECTS AND FOLATE SUPPLEMENTATION OF BREAD

Anyone who lived in South Wales or Ireland in the 1950s and 1960s and who had their eyes and ears open can attest that neural tube defects of spina bifida and anencephaly were common. There were about 90 cases per 10,000 births, three times the number in Southern England, and ten times higher than in South Asia or Africa. *Bandolier* remembers attending lectures where association with tea-drinking and bad potatoes were suggested as possible causes.

Now rates are much, much, lower. Now we know about the importance of folic acid in the prenatal and early days of pregnancy, in the crucial period when the neural tissue is forming. Newer and better methods of detecting neural tube defects, with blood and ultrasound screening, means that many affected pregnancies are terminated.

Better than termination is prevention. Prevention involves ensuring that women of child-bearing age have adequate or supplemented folic acid in their diet. One of the changes in previously badly-affected regions was the advent of the chain food stores with fresh and frozen vegetables all year round – the “Tesco effect”. In the United States mandatory fortification of cereal grain products went into effect in January 1998. The effect of this comes from a report from the Centres of Disease Control [1].

## Study

Eight population-based surveillance systems provided data from sources performing diagnostic prenatal ultrasound as part of their surveillance programmes. The number of spina bifida and anencephaly-affected pregnancies were added together to provide an estimated total of neural tube defect (NTD) affected pregnancies, and prevalence multiplied by US births for total numbers in the USA. The number of affected pregnancies included live births, stillbirths, foetal deaths, and elective terminations.

Two periods were studied, a 24-month pre-fortification period in 1995 and 1996, and a 24-month post-fortification period in 1999-2000.

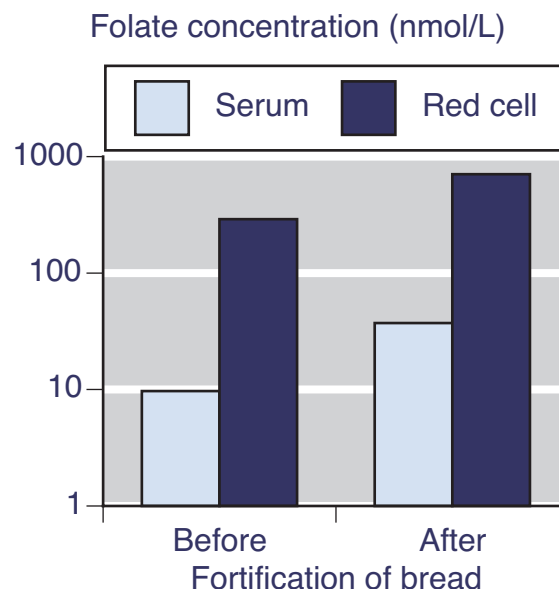
## Results

Table 1 shows prevalence and numbers for the two periods. The estimated number of affected pregnancies fell by 27%.

**Table 1: Prevalence and numbers of neural tube defects in the United States estimated from sites with diagnostic prenatal ultrasound before and after cereal fortification with folic acid**

	Spina bifida		Anencephaly		Total NTD (USA)
	Prevalence (per 10,000 live births)	Number (USA)	Prevalence (per 10,000 live births)	Number (USA)	
Before fortification (1995-1996)	6.4	2,490	4.2	1,640	4,130
After fortification (1999-2000)	5.1	1,980	3.5	1,380	3,020

**Figure 1: Serum and red cell concentrations (log scale) in Chilean women before and after fortification of bread**



## Comment

Fortification of cereal products with folic acid increases blood folate levels. In Chile [2], fortification of bread to an average level of 2 mg folic acid per kilogram of bread raised serum and red cell folate substantially (Figure 1).

It would be wonderful if every woman of child-bearing age ate enough fruit and vegetables that supplementation before pregnancy was unnecessary, but that is baying for the moon. Folic acid consumption in diet and supplements has a strong dose response, and better ways have to be found to get the message across. Perhaps food supplementation with folic acid would be useful across the population, given its general antioxidant properties? The targets would be heart disease and cancer, as well as neural tube defects. It would be worth taking a look at the evidence when it is available.

### References:

- 1 P Mersereau et al. Spina bifida and anencephaly before and after folic acid mandate – United States, 1995-1996 and 1999-2000. MMWR 2004 53: 362-365.
- 2 F Hertrampf et al. Consumption of folic acid-fortified bread improves folate status in women of reproductive age in Chile. Journal of Nutrition 2003 133: 3166-3169.

# MYTHBUSTERS: ASPARAGUS AND BEETROOT

Is it only *Bandolier* who has a colleague who can unfailingly, year after year, ask, at the start of the asparagus season, whether asparagus makes one's urine smell? Nothing can help us deal with this myth better than facts, and, as is so often the case, some clever soul has done the job already, and an even cleverer computer can find it for us. While not badged as a systematic review, this paper [1] has so much detail it can hardly not be.

## Asparagus

Asparagusic acid is the culprit, or alpha-aminodimethylgamma-butyrothetin for those of chemical mind. It is found in asparagus, and a few other food plants, though some non-food plants like tropical mangrove also contain it. The other interesting thing about asparagusic acid, other than being the chemical that probably makes urine smell after eating asparagus, is that it kills parasitic nematodes, and protects the asparagus plant against them.

But the asparagus and smelly urine problem is more complicated. Not all of us can actually smell the smell in urine if it is there. The frequency of this inability to smell the odour is high, and tests have shown that 90% of an Israeli population and 75% of a Chinese population have anosmia (inability to smell). There is another proportion of the population with a degree of hyposmia, in which the smell is not distinct and can be confused with other smells.

Clearly this complicates finding out how many people have smelly urine after eating asparagus. Self-report is no use, and studies would need objective (and ideally blind) independent smelling of the urine. With this caveat, it seems that about 40% of the UK population produce smelly urine after eating asparagus based on tests on almost 1,000 people. Other studies suggest that French, Israeli and Chinese populations all produce odorous urine. It may all be down to the smelling.

The interesting thing about asparagus is that despite appearing in historical works for about 2,500 years, it was only in the 1700s that it was associated with malodorous urine. This coincided with the use of sulphur-rich fertilizers to improve the flavour of asparagus and onions and garlic.

## Beetroot

The red colour of beetroot comes from pigments called betacyanins. These are acid/base indicators that are structurally unstable at extremes of pH, and have optical stability at pH 4 to 5. Red colour in urine, therefore, is dependent on urine pH. For the urine to be red, unchanged beetroot pigments have to be absorbed, and excreted.

During digestion beetroot pigments are subjected to changes in pH, especially the low pH in the stomach. At a pH of 2, found in the fasting stomach, the betacyanins are rapidly decomposed. Conditions where stomach pH is higher, and

where there is rapid gastric emptying, would be more likely to cause coloured urine after eating beetroot.

All of which makes it unsurprising that all of us have beetroot pigments in our urine after eating beetroot. In most, though, the colour is too faint to see with the naked eye, though clearly present when investigated by chromatography in the laboratory. Older research indicated anything between 0% and 90% prevalence of red urine after eating beetroot.

What makes urine red depends. It depends on the type of beetroot, the way it is prepared, how much is eaten, what else is eaten, and other factors, like protective effects of oxalic acid. Those other factors may include use of drugs that raise gastric pH, especially histamine antagonists and proton pump inhibitors. There is at least one case-report of erythruia (red urine) after eating beetroot while on ranitidine [2].

## Comment

So red urine is no big deal, just a bigger deal in some more than others. It's worth asking about beetroot and stomach pills before chasing haematuria with no obvious cause. *Bandolier* is reminded that black tongue (an adverse effect for some antidepressants) is more likely to be due to sucking a biro.

There is interesting stuff here. To historians the paper opens a fascinating door on the past. Not only the medical past, with descriptions of observations by doctors several hundred years ago, but also the distant past. Asparagus was apparently mentioned in ancient Greek legend, and by Greek and Roman writers. Cato the Elder, writing before 150 BC, gave detailed instructions for its cultivation.

More interesting is that both these examples shed light on drug metabolism, perhaps why such an erudite essay comes from a department of molecular toxicology. It reminds us that it is not all in the genes. But most of all it should remove the annual torture of the asparagus myth.

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